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USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

Enhanced Preliminary Assessment Report:

Old Bridge Army Housing Units
Old Bridge, New Jersey



November 1989

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prepared for

Commander
U.S. Army Toxic and Hazardous Materials Agency
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SUMMARY

The Old Bridge housing area in Middlesex County, N.J., does not present an imminent or substantial threat to human health or the environment. There is no evidence to suggest that hazardous or toxic constituents have ever been released from this property, and no immediate remedial actions are warranted for the site. Nevertheless, several potential environmental problems have been identified at this facility, and further investigation is recommended.

This property was originally developed in conjunction with a Nike missile battery located near Old Bridge, N.J. No record exists of any wastes associated with the operation and maintenance of the missile-launch or fire-control systems having ever been delivered to or managed at this housing property. Potable water and sewage-treatment service are currently provided by facilities located on land originally part of the fire-control area of the old Nike battery. The possibility exists of missile-related contaminants migrating along buried water and sewage lines from the former fire-control area to the housing area.

Ownership of the water well, pumphouse, water tank, and 1.75 acres of land in which these facilities are located is unclear because of uncertainties associated with the 1975 expropriation of the former fire-control area. It is also uncertain whether potable water will continue to be provided by these facilities after the housing area is expropriated. These issues should be resolved before the property is released.

Underground storage tanks for heating oil, located at each housing unit on the property, are of concern. Although there is no documentation of reported failures or suspected leaks in any of these tanks, real property records indicate that the tanks are more than 30 years old; no records indicate that they were installed with cathodic protection or protective coatings. Each of the underground tanks may therefore be at or near the end of its effective life.

Electrical service at the Old Bridge housing area is provided by a local public utility, but the transformers located on utility poles within the facility are owned and maintained by the U.S. government. These transformers are not routinely inspected for possible leakage, and they have never been tested for possible inclusion of polychlorinated biphenyls (PCBs). Potential PCB contamination of soil and groundwater from leaks or spills associated with these transformers is a concern, although no such spills or leaks were apparent during the site inspection.

The original floor tiles used in these housing units are believed to have contained asbestos. In recent years, the old flooring has been systematically replaced whenever a change of tenant occurred, but the possibility exists that original flooring is still present in a few units.

Prior to release of this property, three specific actions are recommended:

- Remove and replace underground fuel-storage tanks at all units, sampling soils in all portions of the tank excavations to identify any possible areas of contamination.
- Test the contents of on-site transformers and sample soil at the bases of transformer poles to determine the presence of PCBs; label transformer contents and remediate any PCB contamination problems found, as required.
- Test soil in the vicinity of the underground water and sewer utility lines for the presence of missile-related contaminants.

These recommendations assume that this property will most likely continue to be used for residential housing.

1 INTRODUCTION

In October 1988, Congress passed the Defense Authorization Amendments and Base Closure and Realignment Act, Public Law 100-526. This legislation provided the framework for making decisions about military base closures and realignments. The overall objective of the legislation is to close and realign bases so as to maximize savings without impairing the Army's overall military mission. In December 1988, the Defense Secretary's ad hoc Commission on Base Realignment and Closure issued its final report nominating candidate installations. The Commission's recommendations, subsequently approved by Congress, affect 111 Army installations, of which 81 are to be closed. Among the affected installations are 53 military housing areas, including the Old Bridge housing area addressed in this preliminary assessment.¹

Legislative directives require that all base closures and realignments be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA). As a result, NEPA documentation is being prepared for all properties scheduled to be closed or realigned. The newly formed Base Closure Division of the U.S. Army Toxic and Hazardous Materials Agency is responsible for supervising the preliminary assessment effort for all affected properties. These USATHAMA assessments will subsequently be incorporated into the NEPA documentation being prepared for the properties.

This document is a report of the enhanced preliminary assessment (PA) conducted by Argonne National Laboratory (ANL) at the Army stand-alone housing area near Old Bridge, N.J.

1.1 AUTHORITY FOR THE PA

The USATHAMA has engaged ANL to support the Base Closure Program by assessing the environmental quality of the installations proposed for closure or realignment. Preliminary assessments are being conducted under the authority of the Defense Department's Installation Restoration Program (IRP); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 91-510, also known as Superfund; the Superfund Amendments and Reauthorization Act of 1986, Public Law 99-499; and the Defense Authorization Amendments and Base Closure and Realignment Act of 1988, Public Law 100-526.

In conducting preliminary assessments, ANL has followed the methodologies and procedures outlined in Phase I of the IRP. Consequently, this PA addresses all documented or suspected incidents of actual or potential release of hazardous or toxic constituents to the environment.

In addition, this PA is "enhanced" to cover topics not normally addressed in a Phase I preliminary assessment. Specifically, this assessment considers and evaluates the following topical areas and issues:

- Status with respect to regulatory compliance,
- Asbestos,
- Polychlorinated biphenyls (PCBs),
- Radon hazards (to be assessed and reported on independently),
- Underground storage tanks,
- Current or potential restraints on facility utilization,
- Environmental issues requiring resolution,
- Health-risk perspectives associated with residential land use, and
- Other environmental concerns that might present impediments to the expeditious "excessing," or transfer and/or release, of federally owned property.

1.2 OBJECTIVES

This enhanced PA is based on existing information from Army housing records of initial property acquisition, initial construction, and major renovations and remodeling performed by local contractors or by the Army Corps of Engineers. The PA effort does not include the generation of new data. The objectives of the PA include:

- Identifying and characterizing all environmentally significant operations (ESOs),
- Identifying property areas or ESOs that may require a site investigation,
- Identifying ESOs or areas of environmental contamination that may require immediate remedial action,
- Identifying other actions that may be necessary to address and resolve all identified environmental problems, and
- Identifying other environmental concerns that may present impediments to the expeditious transfer of this property.

1.3 PROCEDURES

The PA began with a review of Army housing records located at Fort Dix, N.J., during the week of August 7-11, 1989. Additional information was obtained by telephone from the Army Corps of Engineers District Office in New York City on August 11, 1989, and from conversations with personnel from the Directorate of Engineering and Housing (DEH) and the Department of Family Housing, Fort Dix, during the period August 7-10. A site visit was conducted at the Old Bridge housing area on August 8, 1989, at which time additional information was obtained through personal observations of the ANL investigator. The interiors of three of the twelve units (#204, 205, and 207) were examined. Photographs were taken of the housing units and surrounding properties as a means of documenting the condition of the housing units and immediate land uses. Site photographs are appended. ANL investigators revisited the property on September 11, 1989, at which time the interiors of all of the units were inspected.

All available information was evaluated with respect to actual or potential releases to air, soil, and surface and ground waters.

2 PROPERTY CHARACTERIZATION

2.1 GENERAL PROPERTY INFORMATION

The Old Bridge housing area is located in eastern New Jersey, near the village of Old Bridge, in Old Bridge Township (identified as Madison Township prior to 1976), in Middlesex County. The housing units occupy 5.53 acres; an additional 1.75 acres are occupied by the pump house and water tank. The housing area is surrounded by woodland sparsely interspersed with residential areas.² The 1980 population of Old Bridge was 6,090.³ The land immediately surrounding the housing area was originally occupied by the fire-control area for the former Nike missile battery. This fire-control land was declared excess in 1975.² No records or documentation of any environmental problems or any sampling or testing associated with the former fire-control area were found. Current usage of this land is described in Sec. 2.4.

Figures 1 and 2 show the general location of the housing area.²

The housing units were constructed in 1957.² Twelve houses, a pumphouse, and a water tank were erected on the property. The pumphouse (Bldg. 213) and the water tank (Bldg. 214) are still listed as property of the U.S. Army, while the well, which lies beneath the pumphouse, is listed as having been deeded to the Township of Madison (now Old Bridge Township).² The well should have been removed from the Excess Action along with Bldgs. 213 and 214, but was inadvertently left in. Also, since Bldgs. 213 and 214 were apparently removed from the 1975 Excessing List, accountability for them was never transferred by the General Services Administration (GSA), and Fort Dix is still responsible for the facilities. However, the Fort Dix DEH has never received documented confirmation of this responsibility.⁴ Because of uncertainties associated with the excessing action in 1975, legal ownership of and responsibility for the well, Bldgs. 213 and 214, and the 1.75 acres of land are in question. In particular, the points that remain to be legally resolved are (1) ownership of Bldgs. 213 and 214, (2) ownership of the well that lies beneath Bldg. 213, (3) ownership of the 1.75 acres of land on which these buildings are located, and (4) accountability and responsibility for the above structures and improvements.⁴

The Army Corps of Engineers district office in New York City is responsible for major renovations or upgrading within the Old Bridge housing facility.

2.2 DESCRIPTION OF FACILITY

Figure 3 presents the site plan of the Old Bridge housing area.

Housing Units

The area contains 12 "Capehart"-style houses -- each has three bedrooms, a family room, carport, and storage room. Capehart is the model name assigned to these houses by the builder, National Homes. The houses are built on concrete slabs.⁵ Water lines and air conditioning ducts are embedded in the foundation slab.

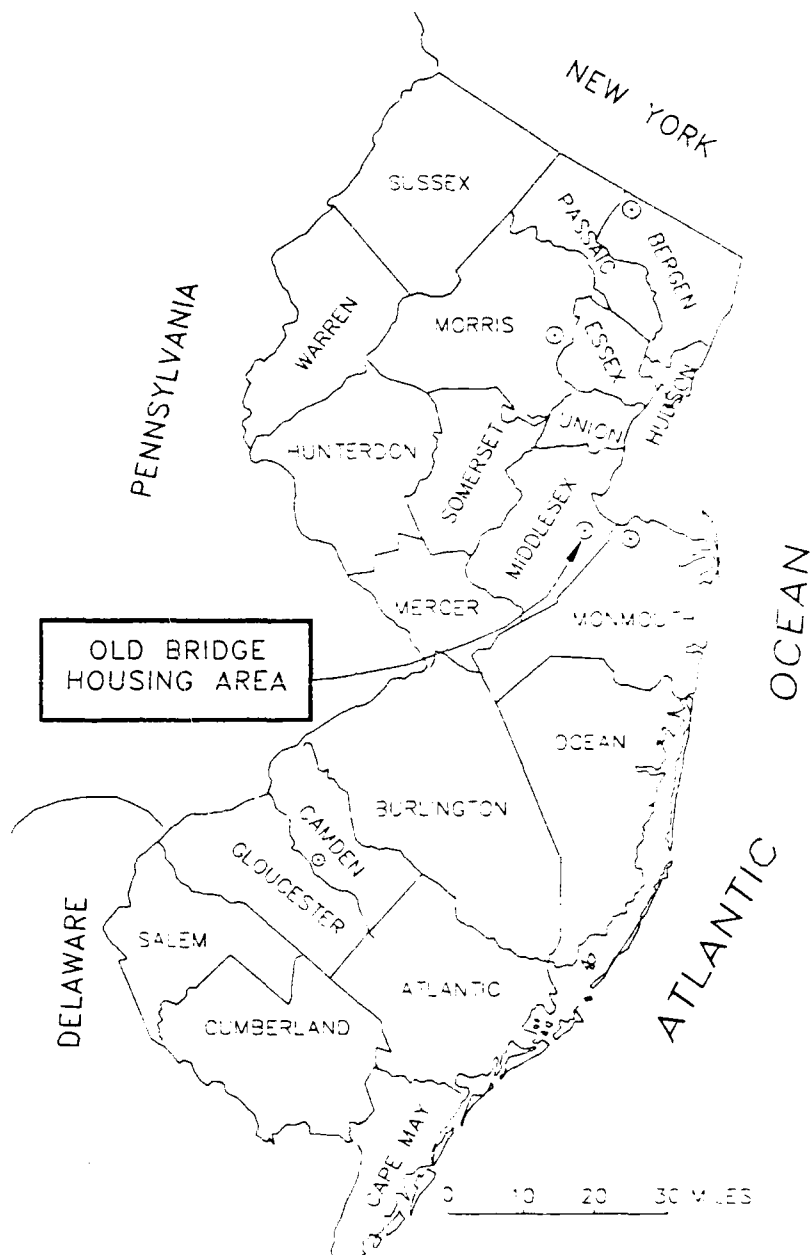


FIGURE 1 Location Map of New Jersey Army Housing Facilities

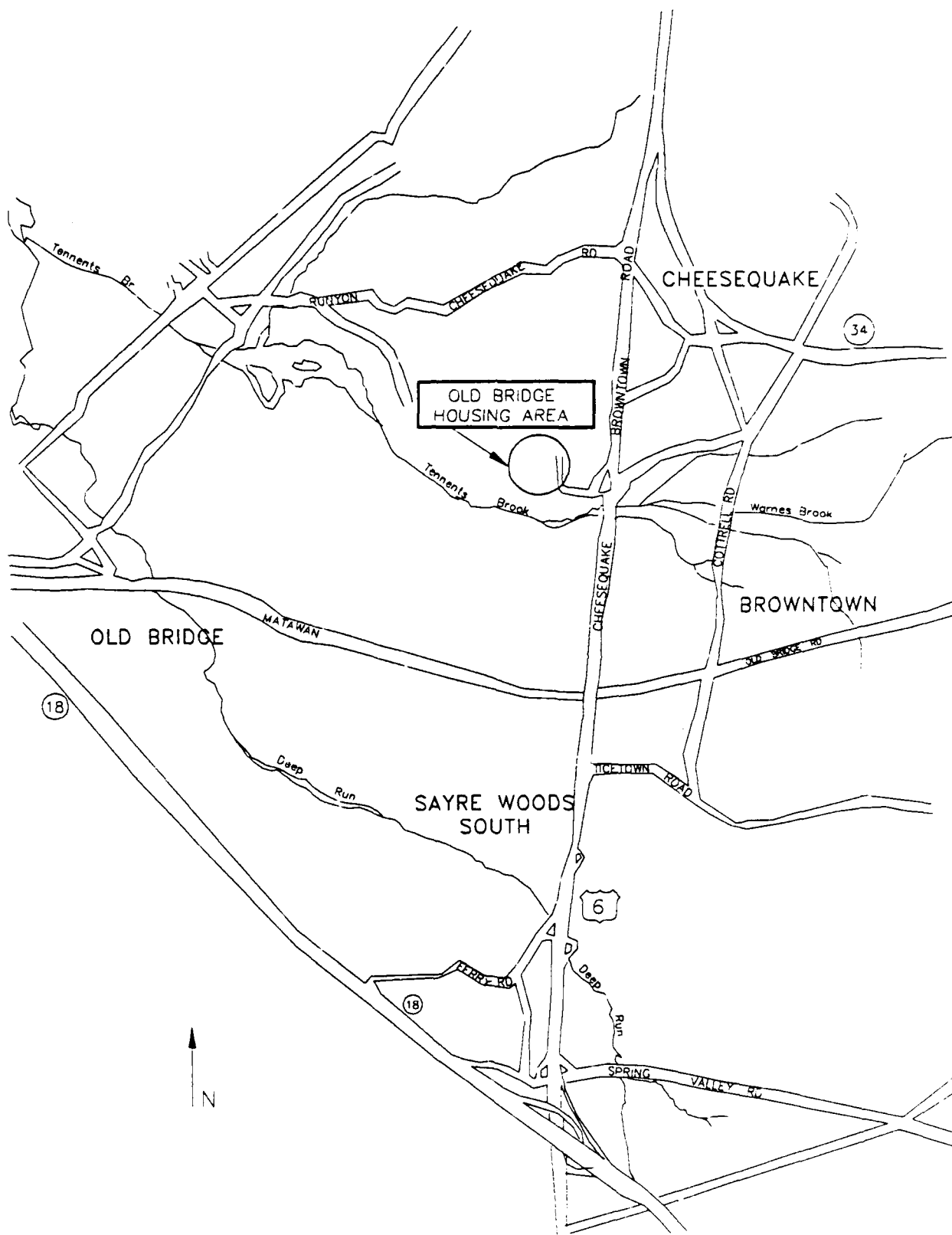


FIGURE 2 Vicinity Map of Old Bridge Army Housing Units

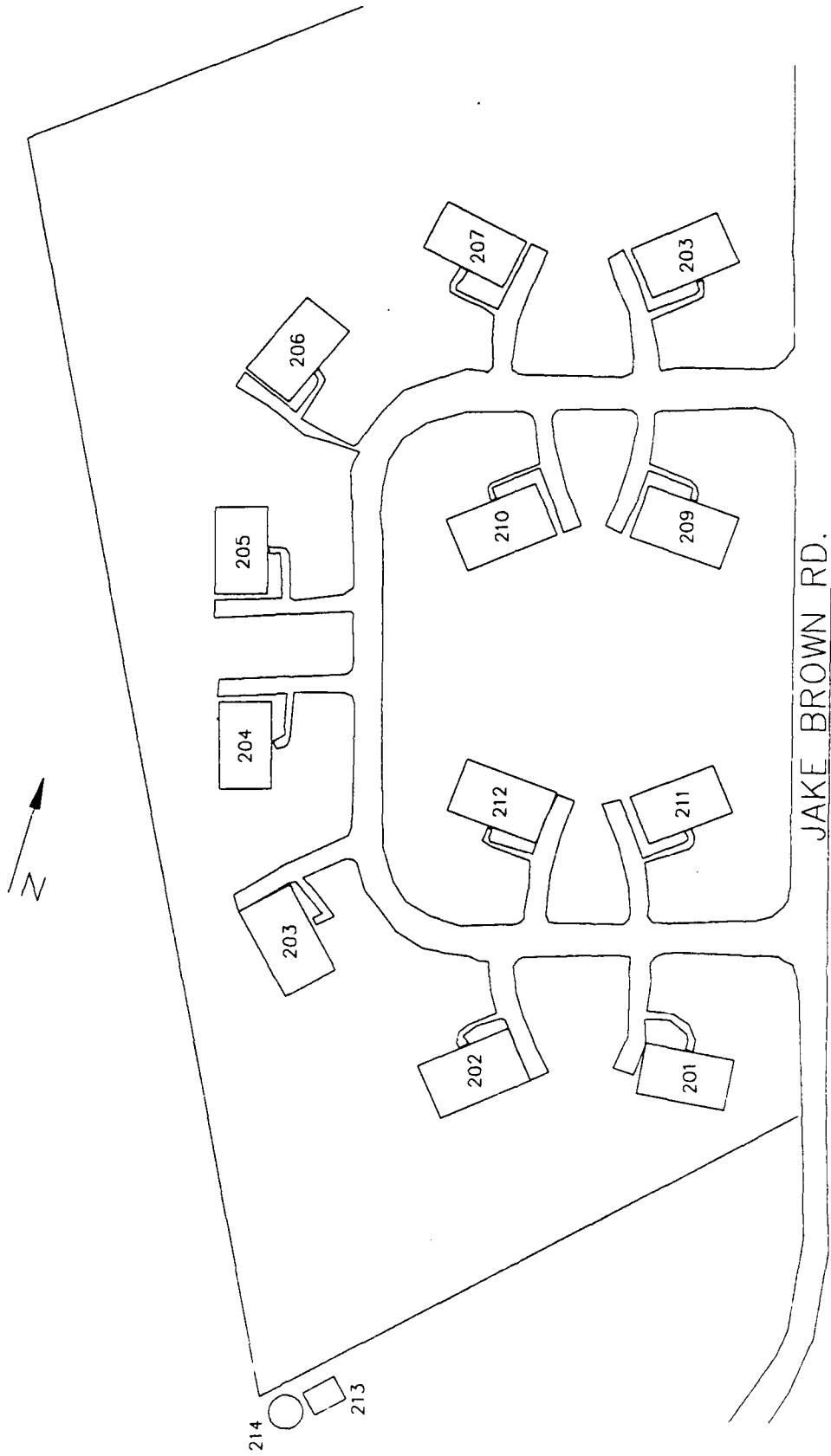


FIGURE 3 Site Plan Map of Old Bridge Army Housing Units

Utilities

Since development of the property, the housing units have been supplied with drinking water from the well immediately adjacent to the housing area (Bldg. 213).² Since 1975, when ownership of the adjacent Nike fire-control area was transferred to Madison (now Old Bridge) Township, the township has been responsible for providing the housing area with drinking water from this same well.² However, as noted above, legal ownership of and responsibility for the well, pumphouse, water tank, and the associated 1.75 acres of land are in question. The property also receives electricity from Old Bridge Township, but on-site telephone poles and electrical transformers are the responsibility of the Army.⁶

Sewage

Sewage treatment has been provided to the Old Bridge housing area since its development in 1957 by a plant located on land that was formerly part of the old Nike battery's fire-control area. The plant is located about 0.5 miles southeast of the housing area at the corner of U.S. Rt. 9 and Jake Brown Road, the access road to the housing area. Responsibility for providing sewage treatment has rested with the township since 1975, when the fire-control area was exscessed.² In 1977, a new sewage-treatment facility was built immediately adjacent to the old one, also on the former fire-control land parcel. The new plant has been used since then and the old one shut down.⁶ The original sewer lines are still being used, however.

Fuel Storage

To the rear of each unit is an underground storage tank that holds 550 gallons of oil for heating.² All tanks are original equipment, installed in 1957.² An additional 50-gallon tank to the rear of each unit supplies liquid propane for a gas-fired stove, oven, and water heater. These tanks are also original equipment dating from 1957.²

Storm Drainage Systems

The property is drained by open ditches or surface runoff in a northeasterly direction to ditches that run along Jake Brown Road.

Other Permanent Structures or Property Improvements

The area's pumphouse and water tank (Bldgs. 213 and 214) are immediately adjacent to the property. As described above, current ownership of and responsibility for these structures are uncertain. In 1958, utility lines were installed in the housing area, and the the road was paved.

2.3 PROPERTY HISTORY

2.3.1 Nike Defense Program and Typical Battery-Level Practices

Generic information on the national Nike antiaircraft defense program has been compiled in two studies, one commissioned by the Army Corps of Engineers⁷ and the other by the U.S. Army Toxic and Hazardous Materials Agency.⁸ In both studies, independent contractors relied on information contained in unclassified documents related to the Nike surface-to-air missile program, including engineering drawings and specifications (for the facilities and the missiles themselves), interviews with Army personnel participating in the Nike program, and operations manuals and directives relating to the operations and maintenance of Nike facilities. Taken together, these two reports represent the most complete assemblage of generic information on the Nike missile program from an environmental perspective. Salient points from both reports are condensed below.

At its zenith in the early 1960s, the Nike program included 291 batteries located throughout the continental United States. The program was completely phased out by 1976, with many of the properties sold to private concerns or excessed to state or local governments for nominal fees.

Nike Ajax missiles were first deployed in 1954 at installations throughout the continental United States, replacing, or in some cases augmenting, conventional artillery batteries and providing protection from aerial attack for strategic resources and population centers. Typically, Nike batteries were located in rural areas encircling the protected area. The Ajax was a two-stage missile using a solid-fuel booster rocket and a liquid-fuel sustainer motor to deliver a warhead to airborne targets.

The Ajax missile was gradually replaced by the Nike Hercules missile, introduced in 1958. Like the Ajax, the Hercules was a two-stage missile, but it differed from the Ajax in that its second stage was a solid-fuel rather than liquid-fuel power source and its payload often was a nuclear rather than conventional warhead. Ajax-to-Hercules conversions occurred between 1958 and 1961 and required little change in existing Nike battery facilities. A third-generation missile, the Zeus, was phased out during development and consequently was never deployed.

A typical Nike missile battery consisted of two distinct and separate operating units, the launch operations and the integrated fire control (IFC) operations. The two operating areas were separated by distances of less than two miles, with lines of sight between them for communications purposes. A third separate area was also sometimes part of the battery. This area was typically equidistant from the two battery operating sites and contained housing for married personnel assigned to the battery. Occasionally, these housing areas also contained battalion headquarters, which were responsible for a number of Nike batteries.

Depending on area characteristics and convenience, the housing areas were often reliant on the launch or IFC sites for utilities such as potable water, electrical power, and sewage treatment. In those instances, buried utility lines connected the housing area

to one or both of the other battery properties. It is also possible, however, that housing areas were completely independent of the missile launcher and tracking operations. In those instances, the necessary utilities were either maintained on the housing site or purchased from the local community. In many localities, as the character of the land area around the housing units changed from rural to suburban or urban, communities extended utility services to the housing unit locations, in which case conversions from independent systems to community systems were made.

A large variety of wastes was associated with the operation and maintenance of Nike missile batteries. Normally encountered wastes included benzene, carbon tetrachloride, chromium and lead (contained in paints and protective coatings), petroleum hydrocarbons, perchloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene. Because of the rural locations of these batteries, and also because very few regulatory controls existed at that time, most of these wastes were managed "on-site." (Unused rocket propellants and explosives, however, would always have been returned to central supply depots and not disposed of on-site.) It is further conceivable that wastes generated at one of the Nike properties may have been transferred to its companion property for management or disposal.

Wastes related to missile operation and maintenance would not have been purposely transferred from a battery operating area to a housing area with no facilities for waste management or disposal. In some instances, however, the sewage treatment facilities for all Nike battery properties were located at the housing area; that possibility cannot be automatically ignored. Finally, where housing areas received various utilities from either of the operating areas, it is also possible that wastes disposed of on those other properties may have migrated to the housing area via the buried utility lines. And since decommissioning of the Nike batteries did not normally involve removal of buried utility or communication lines, any such contaminant migration is likely to have gone unnoticed.

2.3.2 Old Bridge Housing Units

The Old Bridge housing area was built in 1957 to provide stand-alone family housing for military personnel assigned to the Nike battery. Twelve single-family houses were erected on the property. After decommissioning of the Nike battery in the early 1970s, the area has continued to be used for housing active-duty military personnel.

Since the initial property development, no other permanent structures have been added, and none of the original structures has been razed. However, renovations have taken place. These include the replacement of kitchen cabinets in 1965; the replacement of sidings, exterior insulation, gutters, fascia, and splash blocks, and the painting of all exterior trim in 1982;⁹ the replacement of windows, roofing, and storage sheds in 1985; and the replacement of flooring during tenant changeovers for the past 5 to 10 years.^{6,10}

2.4 ENVIRONMENTAL SETTING AND SURROUNDING LAND USE

The Old Bridge housing area is located in a relatively flat, predominantly wooded, sparsely developed area. U.S. Highway 9 lies approximately 0.5 mile east of the housing area; Tennents Brook, a stream that drains land in the vicinity of the housing area, is located about 0.5 mile to the south. To the west and northwest lie undeveloped woodland. The town of Old Bridge is located about 1.5 miles to the southwest, the town of Sayre Woods South about one mile south, and the town of Browntown about 0.75 mile southeast of the housing area. With the exception of the land parcel on which the sewage-treatment plant is located, which now apparently belongs to Old Bridge Township, the former fire-control area is now privately owned.

2.5 GEOLOGIC AND HYDROLOGIC SETTINGS¹¹⁻¹³

The Old Bridge housing area is situated near the western edge of the Atlantic Coastal Plain Physiographic Province, which is characterized by flat to gently rolling terrain and generally low elevations that decrease gradually in a southeasterly direction. The line of demarcation (fall line) between the Atlantic Coastal Plain and the adjacent Piedmont Physiographic Province bisects New Jersey in a southwesterly direction, beginning at the western end of Raritan Bay and passing through the city of Trenton. Old Bridge is located about 7.5 miles southeast of the fall line. The coastal plain, which lies southeast of the fall line, is underlain by a wedge of sedimentary rocks that have been deposited during periods of elevated sea level. The rocks range in age from the Cretaceous period (approximately 100-135 million years ago) to the present. The thickness of the sedimentary rocks increases in a southeasterly direction, from near zero along the fall line to approximately 6,500 feet near the tip of Cape May in southern New Jersey. Sedimentary deposits near the Old Bridge housing area are approximately 200 to 300 feet thick.

The sedimentary deposits that underlie the New Jersey coastal plain form one interrelated aquifer system that includes five major aquifers and adjacent confining layers. In the vicinity of the Old Bridge housing area, because of the proximity of the fall line and consequent thinness of the Cretaceous sedimentary deposits, only two aquifers within these layers are important. The Farrington (or Raritan) aquifer lies unconformably atop the pre-Cretaceous basement rock, and this aquifer in its turn is overlain by the Old Bridge (or Magothy) aquifer. The basement rock in Middlesex County consists of basalt, sandstone, and shale of Triassic age. The Woodbury Clay and Merchantville formations form a confining layer above the Magothy aquifer; the thickness of this confining layer is less than 100 feet near Old Bridge. Above these lie surficial soils. Groundwater may be obtained both from the Farrington and Old Bridge aquifers as well as in localized areas from the Triassic basement rocks.

3 ENVIRONMENTALLY SIGNIFICANT OPERATIONS

3.1 UNDERGROUND FUEL-STORAGE TANKS

To the rear of each unit is a 550-gallon underground fuel-storage tank. The fill pipe is also located behind each house. No evidence was observed of staining or other soil discoloration near any of the fill pipes examined. Although no documentation was found to indicate failures or suspected leaks at any of these tanks, real property records show that the tanks are original equipment and therefore more than 30 years old. Also, no indications were found to indicate that any type of corrosion-prevention measures were adopted when these tanks were installed. Potentially, an environmental risk results from the continued use of these aging tanks.

3.2 TRANSFORMERS

Electrical service to the Old Bridge housing area is provided by a local public utility, but all on-site transformers are the responsibility of the Army. No record of any inspection of these transformers for leakage or of any testing of their contents for the presence of PCBs was found. However, no evidence of spills or leaks was observed during the site visit.

3.3 ASBESTOS

It is suspected that the original floor tiles used in the Old Bridge houses contain asbestos. Although the old flooring has been systematically replaced over the past 5 to 10 years, during tenant changes, a few units may still have original flooring.¹⁰ No evidence of the presence of asbestos in the Old Bridge units was observed during the ANL site visit.

3.4 UTILITY CONNECTIONS WITH FORMER FIRE-CONTROL AREA

As indicated earlier, the sewage-treatment facility that services the Old Bridge housing area is located nearby, on land once part of the fire-control area associated with the Nike battery. Although no records still exist to show the details of the connections, it is likely that the old treatment plant serviced the fire-control area as well as the housing area. A lift station, located just across Jake Brown Road from the housing area, is used to pump wastewater from the housing area to the treatment plant. Although the topography is relatively flat, the possibility exists that missile-related contaminants may have migrated along the buried sewer lines from the treatment plant to the housing area.

It is also reasonable to believe that potable water used in the fire-control area came from the well adjacent to the housing area. Similar migration of contaminants from the fire-control area may have taken place along water lines that formerly connected the two areas.

4 KNOWN AND SUSPECTED RELEASES

No major releases or impacts to the environment are known to have occurred at the Old Bridge housing area. No hazardous wastes or hazardous materials are stored on-site. No documentation of known or suspected releases from the underground fuel-oil storage tanks could be found.

Original floor tiles in the housing units may have contained asbestos. However, most of the floor tiles have been replaced in recent years with nonasbestos substitutes. There is no record of problems with deterioration of asbestos-containing tiles. It is unclear how many of the units still contain their original floor tiles.

5 PRELIMINARY ASSESSMENT CONCLUSIONS

Although these housing units were originally developed in support of a Nike missile battery, no Nike-related wastes were delivered to this property for management or disposal. However, since this property was connected with the nearby fire-control area of the old Nike battery by buried potable water and sewage lines, missile-related contaminants could have migrated along those buried lines to the housing area. Legal ownership of and responsibility for the water well and associated buildings together with 1.75 acres of land are currently uncertain.

The original flooring material in these housing units is believed to have contained asbestos. Although a program for the systematic replacement of the old flooring has been ongoing for several years, original flooring may still exist in a few units.

Real property records also indicate that the original underground fuel-storage tanks installed at each unit are still in service. Assuming an expected lifetime of approximately 20 to 25 years, these tanks are at or near the end of their useful lives. Furthermore, since the tanks were installed without corrosion protection, potential for leakage from some of them is high. Integrity testing has never been performed on any of these tanks, however, and conclusive statements regarding releases of stored product from any of them are not possible.

Although electrical service is provided to the Old Bridge housing area by a local public utility, the on-site transformers are original equipment items installed when the housing area was built in 1957. The Army has been responsible for their inspection and maintenance from that time until the present. The presence of PCBs in these transformers has never been investigated, nor are the transformers routinely inspected for leakage, although no such leakage was apparent at the time of the site visit.

6 RECOMMENDATIONS

It is unclear as to who owns and is responsible for the water well and 1.75 acres on which the housing area's pumphouse and water tank are situated. It is also uncertain whether this potable water service will continue to be provided after the housing area is excessed. These issues should be resolved before the property is released.

Because the original heating oil tanks are still in place underground at this property, and assumed to be near or at the end of their expected useful life, it is recommended that all underground tanks be removed and replaced with new tanks. It is also recommended that soil taken from all portions of the tank excavations be tested to identify any contamination present.

Electrical transformers on-site should be inspected for possible leakage. It is also recommended that on-site transformers, as well as the soil at the base of transformer poles, be tested for the presence of PCBs; that the contents of the transformers be labeled; and that any contamination found be remediated as required.

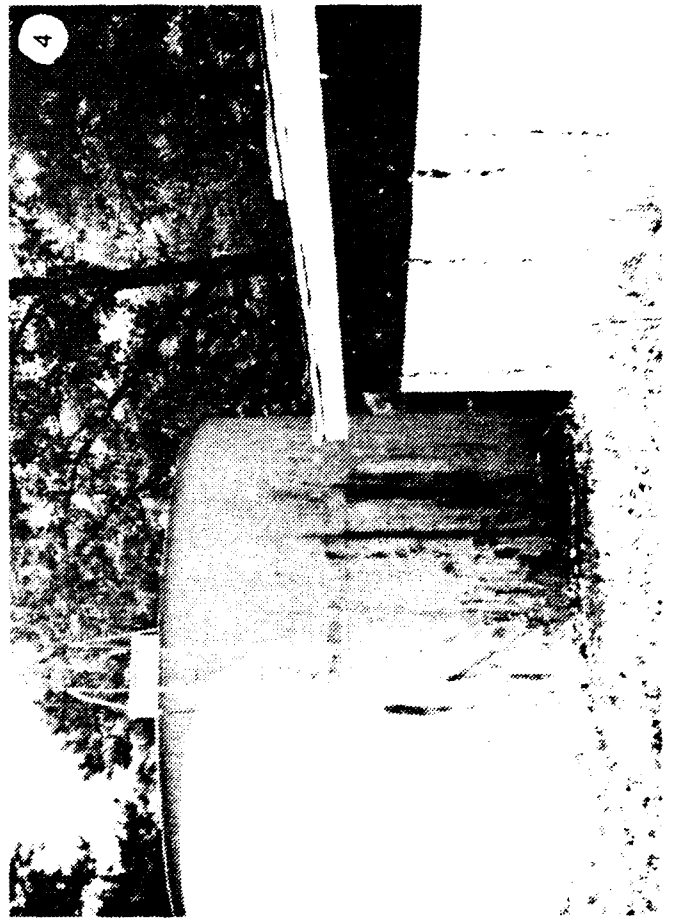
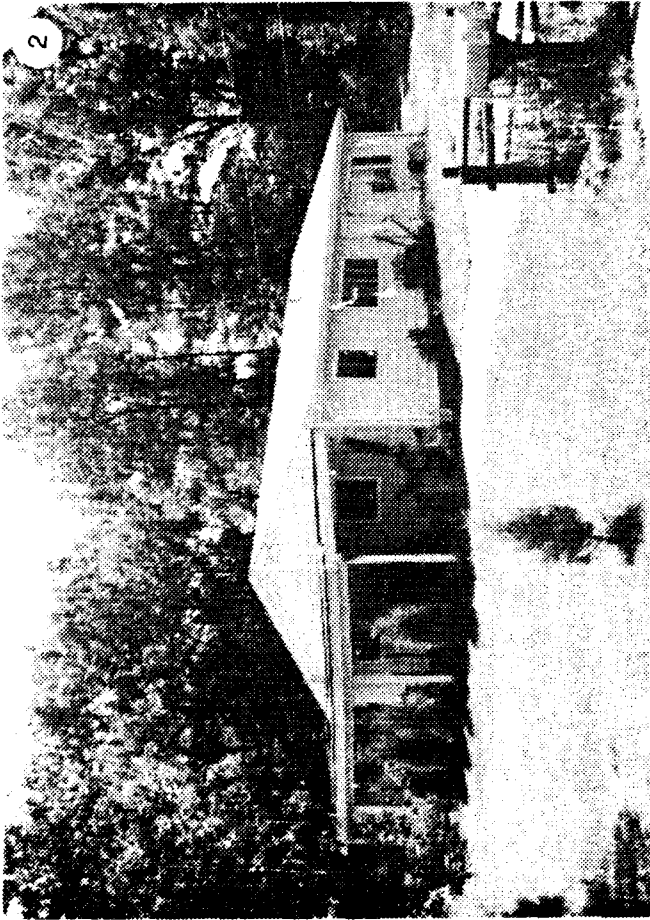
Since the housing area is connected by buried utility lines to land that was at one time part of the Nike battery's fire-control area, it is recommended that soil from along these lines be tested for the presence of missile-related wastes.

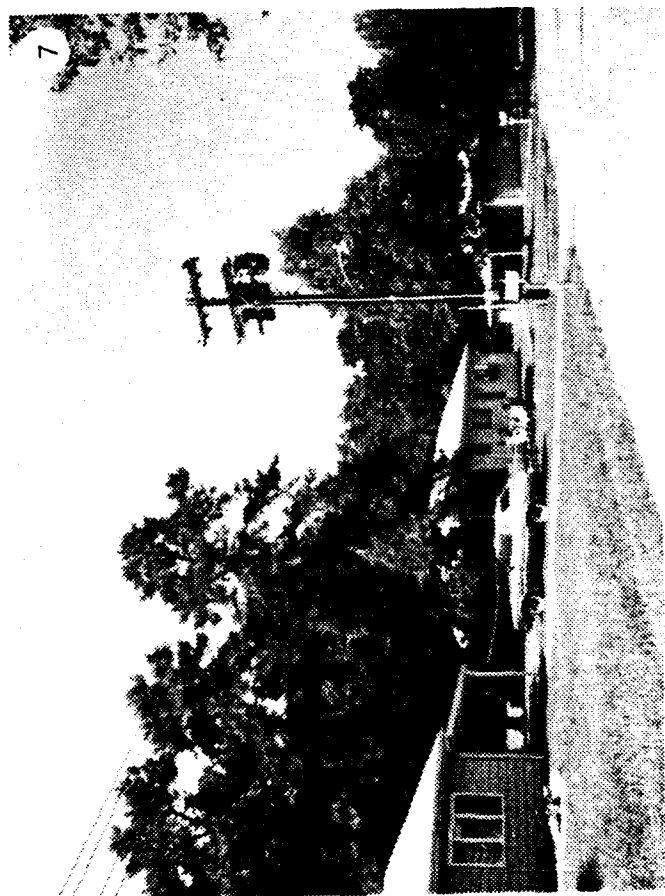
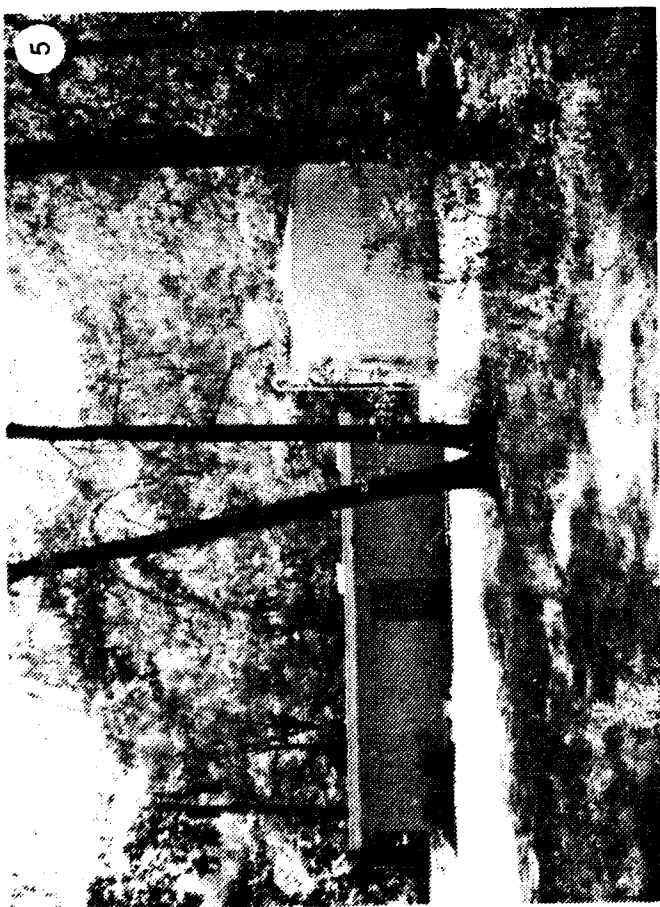
These recommendations assume that this property will most likely continue to be used for residential housing.

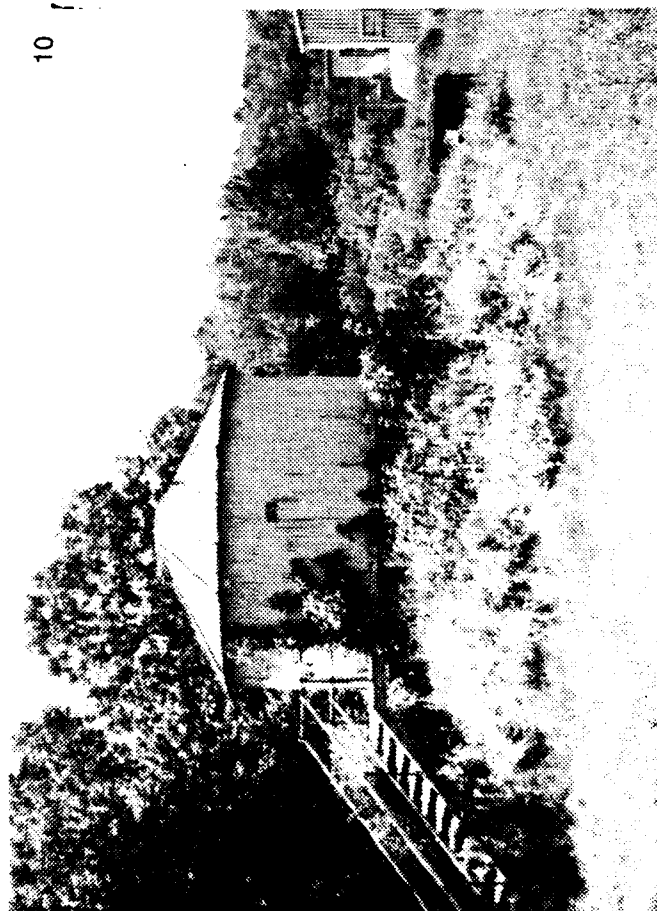
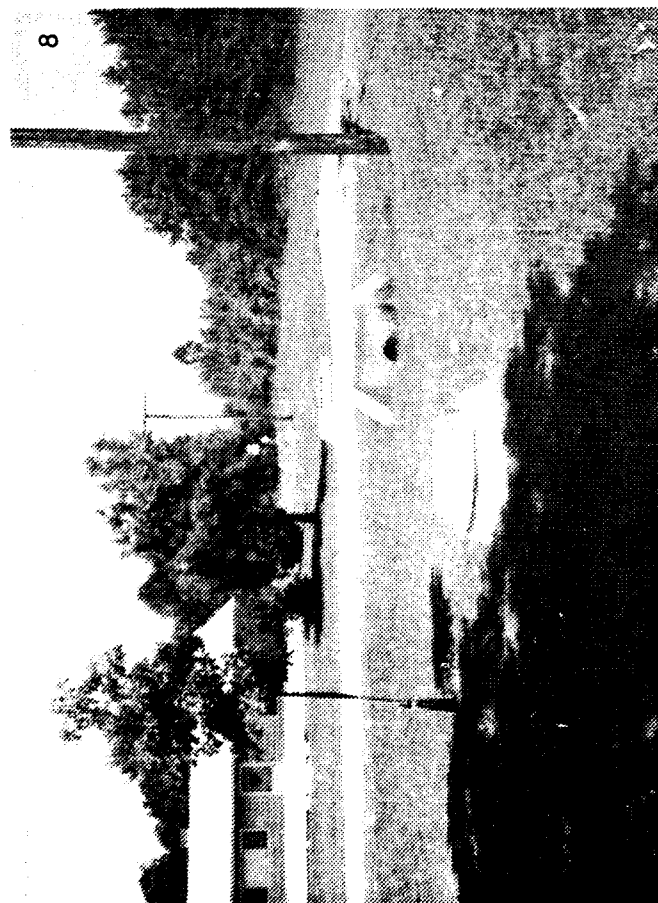
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APPENDIX:
PHOTOGRAPHS OF OLD BRIDGE HOUSING FACILITY
AND SURROUNDING LAND







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IDENTIFICATIONS OF PHOTOGRAPHS

1. Main entrance to the housing area.
2. One of the Capehart single-family homes, with adjacent wooded area.
3. The rear of a housing unit; liquid propane is stored in the cylinder seen at the middle right; fill pipe for the underground fuel oil storage tank can be seen in the foreground, immediately to the right of clothesline pole.
4. Pumphouse and water storage tank at the facility.
5. Another view of the pumphouse and water storage tank.
6. Electrical transformers atop a utility pole; building in front of the pole is the pumphouse; transformers are the responsibility of the U.S. government.
7. Utility pole and transformers in front of housing units.
8. Sanitary sewer manhole and a culvert seen here.
9. At the bottom left is the sanitary sewer lift station; station is across the street from the manhole shown in the previous picture.
10. An old sewage-treatment facility, located about 0.5 mile down the road from the housing site, in the former fire-control area of the old Nike battery.